

**REMARKS**

**I. Introduction**

In response to the pending Office Action, Applicants have amended claim 1 to further clarify the scope of the present invention. Support for the amendment to claim 1 may be found, for example, in Fig. 2 and related sections of the specification. No new matter has been added.

Applicants note claims 2, 3 and 4-18 are also pending and withdrawn, and as such, request correction in the next Office Action Summary.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art.

**II. The Rejection of Claims 1 And 4-8 Under 35 U.S.C. § 103**

Claims 1 and 4-8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Inoue et al. (JP 2000-243459) in view of Galbraith et al. (USP No. 6,271,647). Applicants respectfully traverse the pending rejection for at least the following reasons.

With regard to the present invention, amended claim 1 recites a life determining method of a nickel-hydride battery, comprising the steps of: preparing beforehand data representing a relationship of life of the battery to load power of a battery in discharge and environmental temperature of a place where the battery is installed and...calculating a first life reduction amount from a natural logarithmic function with the number-of-discharges of the battery as a variable.

Similarly, claim 4 recites a life determining apparatus of a nickel-hydride battery having a first life reduction amount calculating means which calculates a first life reduction amount

from a natural logarithmic function with the number-of-discharges counted by the number-of-discharges counting means as a variable.

One feature of the present invention is that the life determining method of a nickel-hydride battery has a step of calculating a first life reduction amount from a natural logarithmic function utilizing the number-of-discharges of the battery as a variable. As a result of this feature, the deviation between the actual and predicted cycle life may be reduced to more accurately determine the life of the battery.

It was alleged that Inoue teaches the step (d) of claim 1 or the limitation of claim 4 of calculating (or calculating means) a first life reduction amount from a natural logarithmic function with the number of discharges of the battery as a variable. This allegation is incorrect. As can be seen in Inoue, the first life reduction amount L1 is calculated from a **linear** function  $L1 = (aN + b) + (cH + d)$  (see, equation 5 in paragraph [0013] of Inoue). As is well known in mathematics, the key feature of linear functions is that the dependent variable (L1) changes at a **constant rate** with the independent variable (N). In other words, for some fixed change in N there is a corresponding fixed change in L1. As the name implies, linear functions are graphically represented by lines.

In contrast to Inoue, natural logarithmic functions have the feature of being **non-linear**. As such, the linear function of Inoue is not a natural logarithmic function because a linear function, by definition, is linear whereas a natural logarithmic function is non-linear. An example of the difference between a linear and non-linear function is shown in the present specification in paragraph [0044]. A calculation method which corresponds to the method disclosed in Inoue is used for Examples 9-11 in Tables 1 and 2. As is shown, the deviation

between the calculated value and the measured value of the remaining life  $L$  is significantly larger than that of the present invention. This difference is due to the fact that, as opposed to the natural logarithmic function being a function whose increase in value lowers as the variable (number of discharges) becomes larger, the value of a linear function always increases at a constant rate in proportion to the increase in the variable.

Accordingly, in view of the foregoing, Inoue does not disclose the step of calculating a first life reduction amount from a natural logarithmic function with the number-of-discharges of the battery as a variable. Moreover, Galbraith does not remedy the deficiency of Inoue. As such, Inoue and Galbraith fail to teach or suggest all of the limitations of claims 1 and 4 of the present disclosure.

In order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. As Inoue and Galbraith, at a minimum, fail to disclose or suggest a life determining method of a nickel-hydride battery, comprising the step of ...calculating a first life reduction amount from a natural logarithmic function with the number-of-discharges of the battery as a variable, OR a life determining apparatus of a nickel-hydride battery having a first life reduction amount calculating means which calculates a first life reduction amount from a natural logarithmic function with the number-of-discharges counted by the number-of-discharges counting means as a variable, it is clear that Inoue and Galbraith, alone or in combination, fail to render claims 1 and 4 obvious. As such, Applicants respectfully request that the § 103 rejection of claims 1 and 4, and all pending dependent claims thereon, be withdrawn.

**III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable**

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1 and 4 are patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.


**IV. Conclusion**

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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